City of Big Bear Lake
Department of Water and Power

FINAL

2010 Urban Water Management Plan

July 2012

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July 11, 2012

Mr. Reggie Lamson
City of Big Bear Lake
Department of Water and Power
41972 Garstin Dr.
Big Bear Lake, CA 92315

Subject: 2010 Urban Water Management Plan

Dear Mr. Lamson:

We are pleased to present the 2010 Urban Water Management Plan (UWMP) to you and the City of Big Bear Lake Department of Water and Power staff. Enclosed are 5 copies of the UWMP report for your use.

We want to thank you for the opportunity to work with you on this interesting project. Please feel free to contact us if you have any questions or need any further assistance.

Sincerely,

CAROLLO ENGINEERS, INC.

Inge Wiersema, P.E.

IW:lc

Enclosures: 2010 UWMP – 5 copies
2010 UWMP – 1 electronic copy

City of Big Bear Lake Department of Water and Power
2010 Urban Water Management Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: _____

Name of person(s) preparing this plan:

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The Water supplier is a: **Municipality**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.3 Appendix B
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.4 Appendix B
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.3 Appendix B
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Appendix B
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.4 Appendix B
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 6.1.7

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.4 Appendix B
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.4 Appendix B
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Figure 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Sections 2.3 and 2.4
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.3
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 6.2 Section 5.1 Tables 6.1 to 6.4
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 5.2 Table 5.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Not Applicable.
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Table 5.4
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 3.1 Table 3.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 3.2
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 3.2
16	Describe the groundwater basin.	10631(b)(2)		Section 3.2
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 3.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Not Applicable.
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.2
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 3.2
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 3.2
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 7.6
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 7.3
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 3.5 Section 7.7
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Chapter 4
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 4.1
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.2
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.3
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Sections 4.2 and 4.3
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.4
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Not Applicable
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 3.3, 3,4 and 3.5
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Sections 7.4 and 7.5
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 7.3
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Chapter 8

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 7.5
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Sections 8.5
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 8.3
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 8.1.1
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 8.3.1
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 8.4
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Section 8.1 Appendix E
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 8.6
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 3.2.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 7.5
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.2
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 6.2
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 6.2
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Not Applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not Applicable

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

City of Big Bear Lake Department of Water and Power

URBAN WATER MANAGEMENT PLAN

Final Draft
July 2012

199 SOUTH LOS ROBLES AVENUE • SUITE 530 • PASADENA, CALIFORNIA 91101 • (626) 535-0180 • FAX (626) 535-0185

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City of Big Bear Lake

Urban Water Management Plan

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LIST OF ABBREVIATIONS

Abbreviation	Description
AB	Assembly Bill
af	Acre Feet
afy	Acre Feet per Year
Basin	Bear Valley Groundwater Basin
BBCCSD	Big Bear City Community Services District
BBARWA	Big Bear Area Regional Wastewater Agency
BMP	Best Management Practice
CII	Commercial/Industrial/Institutional
City	City of Big Bear Lake
CLAWA	Crestline Lake Arrowhead Water Agency
CIMIS	California Irrigation Management Information System
CUWCC	California Urban Water Conservation Council
DWP	City of Big Bear Lake Department of Water and Power
DWR	Department of Water Resources
DMMs	Demand Management Measures
DWR	Department of Water Resources
ETo	Evapotranspiration
gpd	Gallons per Day
gpcd	Gallons per Capita per Day
gpm	Gallons per Minute
mgd	Million Gallons per Day
MOU	Memorandum of Understanding
RHNA	Regional Housing Needs and Allocation
SB	Senate Bill
ULFT	Ultra Low Flush Toilet
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
Valley	Bear Valley

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Chapter 1

INTRODUCTION

1.1 PURPOSE

The California Water Code requires urban water suppliers to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs must be filed every five years to satisfy the requirements of the Urban Water Management Planning Act (UWMPA). The UWMPA requires urban water suppliers servicing 3,000 or more connections or supplying more than 3,000 acre-feet (af) of water annually, to prepare an UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, verify that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions. This report, which was prepared in compliance with the California Water Code and as set forth in the guidelines established by the DWR, constitutes the City of Big Bear Lake's 2010 UWMP.

1.2 BACKGROUND

1.2.1 Urban Water Management Planning Act

The California Water Code Division 6 was modified by AB 797 and the creation of the UWMPA in 1983. Several amendments to the original UWMPA increased data requirements and the planning elements to be included in the 2005 and 2010 UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over 20 years, in 5-year periods. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed and for use in developing Water Supply Assessments.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures, and a water shortage contingency plan. Recycled water was added to the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies when supply shortages are predicted. Each water supplier must also describe Best Management Practices (BMPs) that are implemented or scheduled for implementation.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are as follows.

- AB 1420: Requires implementation of demand management measures/ BMPs and meeting a 20 percent demand reduction by 2020 to qualify for water management grants or loans.
- AB 1465: Requires water suppliers to describe opportunities related to recycled water use and stormwater recapture to offset potable water use.
- SB 1087: Requires water suppliers to report projected water demands for planned lower income units.
- Amendment SB 318 (Alpert, 2004): Requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.
- AB 105 (Wiggins, 2004): Requires urban water suppliers to submit their UWMPs to the California State Library.
- SBx7-7 (Water Conservation Act of 2009): Requires development and use of new methodologies for reporting population growth estimates, baseline per capita use, and per capita targets for 2015 and 2020. This bill also extended the 2010 UWMP adoption deadline for retail agencies to July 1, 2011.

References used in the writing of this report can be found in Appendix A. Appendix B contains the various documents used in report's adoption, while the UWMPA is included for reference in Appendix C.

1.2.2 Previous Urban Water Management Plan

The City of Big Bear Lake (City) previously prepared an UWMP in 2005, which was approved and adopted on April 25, 2006. The 2010 UWMP report serves as an update to the 2005 UWMP and pulls extensively from that report.

1.3 COORDINATION WITH APPROPRIATE AGENCIES

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies.

> *10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

While preparing the 2010 UWMP, the City of Big Bear Lake Department of Water and Power (DWP) coordinated its efforts with relevant agencies to ensure that the data and issues discussed in the plan were presented accurately. Table 1.1 summarizes how the UWMP preparation was coordinated with different agencies.

Table 1.1 Coordination with Appropriate Agencies

Agencies	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved/ Not Informed
Big Bear Area Regional Wastewater Agency		X		X	X		
Crestline Lake Arrowhead Water Agency				X	X		
San Bernardino County				X	X		
Big Bear City Community Services District				X	X		
City of Big Bear Lake Planning Department				X	X		
Big Bear Municipal Water District		X		X	X		

1.4 PUBLIC PARTICIPATION AND PLAN ADOPTION

The UWMPA requires that the UWMP show the water agency solicited public participation.

> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

In accordance with the UWMPA, the DWP held a public hearing and adopted the 2010 UWMP on June 26, 2012. A copy of the associated documentation is included in Appendix B.

Notices were published informing interested parties that the draft 2010 UWMP was available for review. Pursuant to California Code Section 6066, a notification of the time and place of the public hearing was published in the local newspaper on June 6, 2012 and June 13, 2012. A notice was also posted on DWP's website. Copies of these notifications are included in Appendix B.

The Final Draft 2010 UWMP was presented to the DWP's Board of Commissioners as an action item on June 26, 2012 and was adopted by resolution following a public hearing. This hearing provided an opportunity for the DWP's customers, residents, and employees to learn and ask questions about the current and future water supply of the DWP.

1.5 REPORT ORGANIZATION

The UWMP contains eight chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 – Introduction. This chapter presents the purpose of this UWMP as well as coordination efforts with appropriate local agencies and discusses the measures used to solicit public participation during the development of the UWMP.

Chapter 2 – Service Area. This chapter presents a description of the water purveyor's service area and its characteristics including climate, population, and other demographic factors.

Chapter 3 – Water Supply Sources. This chapter presents a description of the DWP's water supply sources including information on the usage of groundwater, imported water and an overview of usage of recycled water.

Chapter 4 – Recycled Water. This chapter includes information on the DWP's future considerations of a recycled water system.

Chapter 5 – Water Demand. This chapter presents a discussion of water demands within the DWP's service area and provides water demand projections through year 2035.

Chapter 6 – Water Conservation. This chapter provides analyses associated with calculations of the water conservation target pursuant to SBx7-7 as well as a description of the DWP's water conservation efforts and BMPs.

Chapter 7 – Water Supply Reliability. This chapter presents the reliability of the DWP's water supplies. This includes a discussion on future imported water reliability. In addition, there is an analysis of supply availability in a single dry year and in multiple dry years.

Chapter 8 – Water Shortage Contingency Plan. This chapter includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure issues and measures to overcome these problems; actions to be taken during a catastrophic interruption of service; and a mechanism for measuring water use reduction.

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Chapter 2

SERVICE AREA AND POPULATION

The UWMPA requires that UWMPs include a description of the water supplier's service area and various aspects of the area served including climate and population.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

2.1 LOCATION

The DWP's water service area is located in Bear Valley (Valley), as well as Rimforest south of Lake Arrowhead, as depicted in Figure 2.1. These areas are located in the San Bernardino Mountains in San Bernardino County, California. Within the Valley, the DWP's service area is located primarily along the south shore of Big Bear Lake. Fawnskin lies to the north of the lake, and the Sugarloaf-Erwin Lake and Lake William systems are located east of Big Bear Lake. In total, the DWP's service areas encompass 5,970 acres, or approximately 9.3 square miles (CDM, 2006).

2.2 LAND USE

The DWP's service area is primarily residential. Recreation has been the most important economic factor in the Valley for nearly a century. As such, residential use composes 95 percent of the total service area. Commercial accounts make up approximately 5 percent and industrial accounts are less than 1 percent of total accounts (CDM, 2005).

2.3 POPULATION

The development of historical population estimates and future population projections for DWP's service area was difficult to estimate due to the low full-time occupancy rate. Therefore, it was important to note that a distinction must be made between the full-time population and the average annual population, which also includes temporary visitors. It was estimated that recreational visitors can increase the current full-time population of approximately 11,000 by as much as 100,000 on peak days, resulting in an average annual population of about 25,000.

2.3.1 Historical Population

Population estimates were obtained from the 2010 U.S. Census. Census data was used to determine the average household size for different sub-areas throughout the DWP service area. Full-time connections comprised approximately one third of all connections, so the number of full-time residential households was identified by dividing the number of all residential connections by three. Full-time residential connections were multiplied by average household size to yield a full-time service area population estimate of 11,320.

The full-time service area population, for previous years, was estimated by combining 2010 full-time residential population data with 2010 residential account data to create an account-to-population ratio. This ratio was combined with historical connection data to estimate historical full-time population data.

Given the influx of weekend and holiday visitors to the service area, it was estimated that average weekend and holiday population would be 5 times the full-time population, or roughly 55,000. This figure was based on discussions with the DWP and City planning staffs. Assuming the DWP served a population of 55,000 for all weekends and holidays throughout the year (totaling 114 days), average annual population was estimated to be 25,500 in 2010. A factor of 2.25 was then applied to all historical full-time populations to produce historical average annual population data (Figure 2.2).

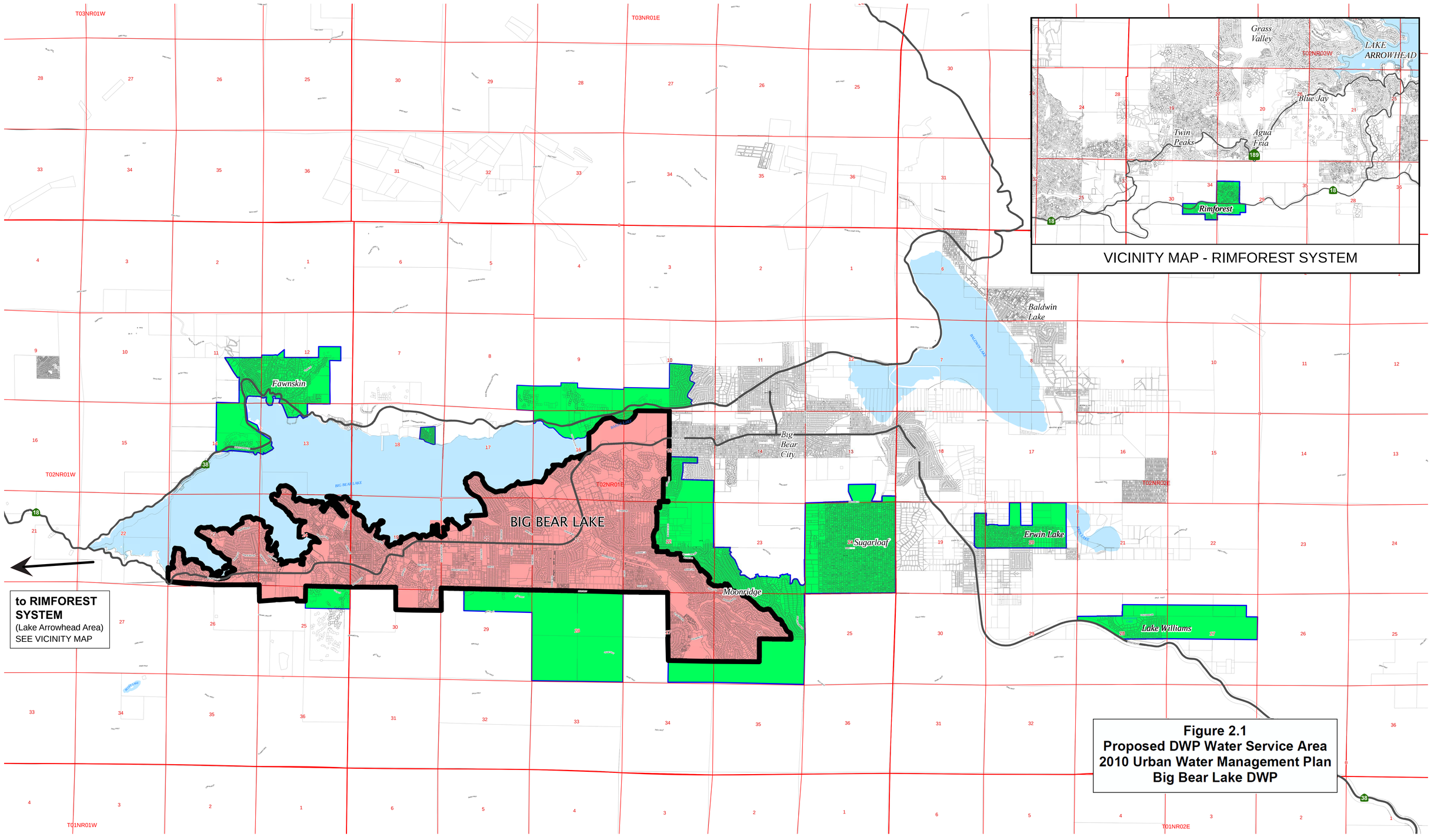

Figure provided by Big Bear Lake DWP staff.

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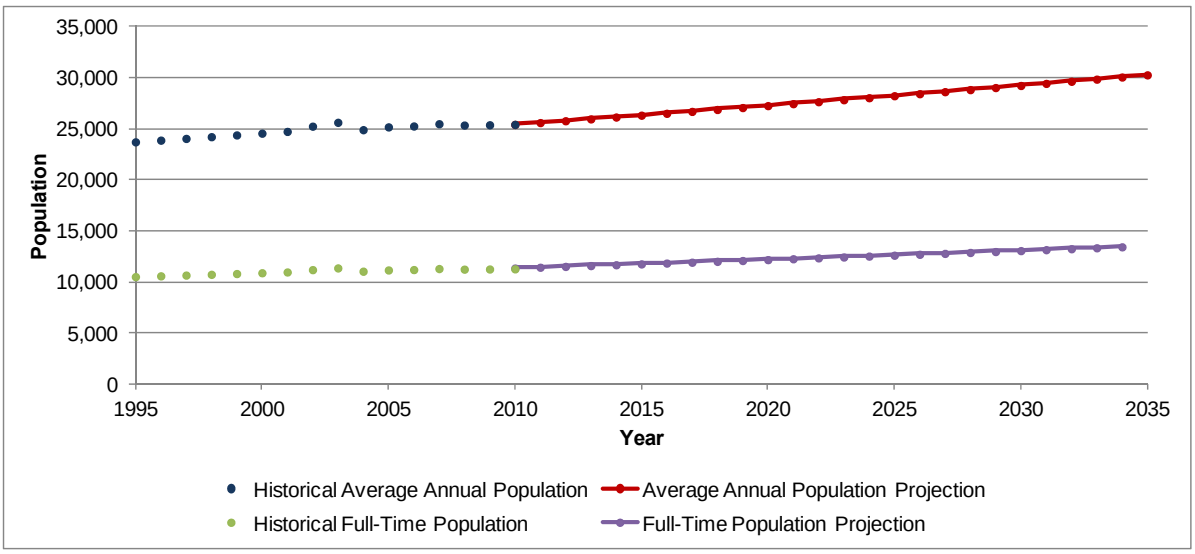

Figure 2.2 Full-Time and Average Annual Historical and Projected Population

2.3.2 Future Population Projections

To generate population projections for future years, an annual growth rate of 0.7 percent was utilized based on long-term historical data collected by both the City and the DWP. Estimated full-time and average annual population projections are listed in Table 2.1 and graphically presented in Figure 2.2. These population projections were used to forecast water requirements for the DWP through year 2035.

Table 2.1 Population Projections

Population	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Full-Time Residents	11,320	11,722	12,138	12,569	13,015	13,477
Average Temporary Population	14,142	14,644	15,164	15,702	16,260	16,837
Average Annual Population(1)	**25,462**	**26,366**	**27,302**	**28,271**	**29,274**	**30,313**

Notes:
(1) Assumes a 0.7% annual growth rate beginning in 2010

It is anticipated that the DWP's service area average annual population will grow by approximately 5,000 over the 25 years to roughly 30,000 in year 2035. The population projections shown in this report represent a more moderate projection than the estimates in previous planning studies for the DWP's service area.

2.4 CLIMATE

The DWP's service area climate is a semi-arid, Mediterranean environment with cold winters, warm summers, and moderate rainfall. Average monthly evapotranspiration (ETo) rates, rainfall, and temperature are summarized in Table 2.2.

The Bear Valley's average monthly temperature ranges from about 34 to 64 degrees Fahrenheit (°F), with an average annual temperature of 47°F. Average annual values of ETo and precipitation are 59 inches and 22 inches, respectively. Records show that the average monthly precipitation ranges from nearly 0 inches to 4.6 inches. Most of the precipitation typically occurs from November through April.

Table 2.2 Climate Characteristics

Month	Standard Average Monthly ETo[1] (inches)	Average Monthly Precipitation[2] (inches)	Average Monthly Temperature[2] (°F)		
			Average	Minimum	Maximum
January	1.8	4.6	33.8	20.2	47.4
February	2.6	4.2	34.8	21.7	47.8
March	4.6	3.1	37.6	24.0	51.2
April	6.0	1.3	42.8	28.0	57.5
May	7.0	0.5	50.6	34.6	66.6
June	7.6	0.1	58.3	40.9	75.6
July	8.1	0.7	64.2	47.5	80.8
August	7.4	0.9	63.3	46.9	79.6
September	5.4	0.5	57.3	40.7	73.9
October	4.1	0.8	48.7	32.4	64.9
November	2.4	2.0	39.8	25.3	54.3
December	1.8	3.2	34.0	20.4	47.5
Annual	**58.6**	**22.0**	**47.1**	**31.9**	**62.2**

Notes:
(1) Source: California Irrigation Management Information System (CIMIS) Station 199 – Big Bear Lake (www.cimis.water.ca.gov). Represents monthly average ETo from July 2005 to March 2012.
(2) (3) Source: Western Regional Climate Center (WRCC) Station 040741 – Big Bear Lake (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0741). Represents monthly average data from July 1960 to January 2012.

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Chapter 3

WATER SUPPLY SOURCES

The UWMPA requires that UWMPs include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on surface water, groundwater, the groundwater basin, potential opportunities for desalination of groundwater and seawater, and detailed information on the agency's imported water.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision 10631 (a)*

3.1 OVERVIEW OF SUPPLIES AND DISTRIBUTION SYSTEMS

The DWP primarily produces potable water from groundwater wells. These wells produce water from the subunits of the Bear Valley groundwater basin, through pumping or by gravity. The DWP does not currently use surface or imported water to meet its water demand, with the exception of the Rimforest area, which is served by imported water delivered from the Crestline Lake Arrowhead Water Agency (CLAWA). The DWP's projected water supplies are summarized in Table 3.1. These quantities meet all state water conservation requirements. As shown, the average annual demand is under the safe yield of the basin, which is 3,100 acre-feet per year (afy), and within DWP's allocation. The perennial yield of the basin is estimated at 4,800 afy (Geoscience, 2006).

Table 3.1 Current and Projected Demand

	Annual Pumping (afy)					
Supply Source	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Groundwater	2,152	2,228	2,307	2,389	2,474	2,562
Imported to Rimforest	53	55	57	59	61	63
Total	**2,205**	**2,283**	**2,364**	**2,448**	**2,535**	**2,625**

Notes:

Supply shown is based on the demands projected in Chapter 5 and meet water conservation requirements associated with the Water Conservation Act of 2009, discussed in Chapter 6. The calculations used for the demands are based on a 0.7% growth in demand each year, beginning in 2010.

3.1.1 Potable Water Systems

The DWP distributes their potable water supply through a distribution system consisting of five water systems with 15 separate pressure zones, 176 miles of pipeline, 62 wells, 16 reservoirs, 12 booster stations, 41 pressure reducing valves, 26 chlorination stations, and

22 sample stations. The DWP operates a total of 62 wells, 39 vertical wells and 23 slant wells.

Potable water meeting all state and federal drinking water standards is delivered from CLAWA to the Rimforest development, providing approximately 60 to 70 afy. Because the Rimforest area is essentially fully developed, demand has historically remained constant and is projected to remain unchanged in the future.

3.1.2 Recycled Water System

The DWP does not supply recycled water within its service area. In a few limited cases, Big Bear Area Regional Wastewater Agency (BBARWA), the regional wastewater agency, supplied recycled water to some customers. This water came directly from BBARWA's treatment plant. There are currently no plans in place to provide recycled water service to the DWP customers.

3.2 GROUNDWATER

10631 (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

10631 (b) (1) A copy of any groundwater management plan adopted by the urban water supplier…

10631 (b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater…For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted…

10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.

10631 (b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.

Groundwater underlying the DWP's service area is of good quality and requires little treatment before use in the potable water supply system. Maximum perennial yield for the Bear Valley groundwater basin has been estimated at 4,800 afy with approximately 3,100 afy of that volume being available to the DWP (CDM, 2006).

3.2.1 Groundwater Basin Description

Bear Valley lies in the northeastern portion of the Santa Ana River Watershed. The Bear Valley groundwater basin (Basin) is primarily composed of alluvium and the main tributaries include Grout Creek, Van Dusen Canyon, Sawmill Canyon, Sand Canyon, Knickerbocker Creek, Metcalf Creek, and North Creek. Based on the drainage system, Bear Valley is divided into 16 hydrologic subunits (LCA, 1987 a & b).

The water bearing deposits within the Valley have been divided into upper, middle, and lower aquifers. The upper and middle aquifers are the primary water-producing formations. The upper aquifer extends through the eastern part of the Basin where it reaches more than 200 feet thick, but is thin and unsaturated in the western portion of the Basin. The middle aquifer is found throughout the Basin and ranges from 150 to more than 800 feet thick (DWR, 2004).

Basin recharge is from percolation of precipitation and runoff, as well as underflow from fractured rock formations. Groundwater levels generally correlate with annual fluctuations of precipitation.

Total storage capacity of the Basin is estimated at 42,000 af. Average inflow is 6,240 afy and main losses to the basin are outflow and pumping (DWR, 2004).

3.2.2 Historical Groundwater Concerns

None of the groundwater basins in the DWP service area are adjudicated. At present, no subunit within the Bear Valley groundwater basin is in overdraft. While the Village subunit was overdrafted in previous years, it has since recovered (CDM, 2005).

3.2.3 Groundwater Pumping

The DWP uses 62 wells to extract water from the Basin. Of these wells, 23 are slant wells and 39 are typical pump powered vertical wells. Annual use of the groundwater has remained relatively constant over the reported timeframe (Table 3.2).

Table 3.2 Amount of Groundwater Pumped by DWP

	Historical Groundwater Pumped from Basin (afy)				
Basin Name	**2006**	**2007**	**2008**	**2009**	**2010**
Bear Valley Basin	2,473	2,672	2,452	2,316	2,152
% of Total Water Supply	**98%**	**98%**	**98%**	**98%**	**98%**

Demand projections are based on the assumption that groundwater will be used to meet all of the DWP's water supply in the Valley, and it is anticipated that the amount of groundwater pumped will gradually increase through year 2035. Groundwater wells will be added to the water systems as needed.

Table 3.3 Amount of Groundwater to be Pumped

	Projected Annual Groundwater Pumped from Basin (afy)					
Basin Name	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Bear Valley Basin	2,152	2,228	2,307	2,389	2,474	2,562
Total	**2,160**	**2,228**	**2,307**	**2,389**	**2,474**	**2,562**

Notes:
(1) Based on total demand in 2010 using population projections from Table 2.1

3.3 IMPORTED WATER

10631 (k). Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that indentifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same 5 year increments, and during various water year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan information requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

Imported water is only used to meet demands in Rimforest. This area is geographically separate from Bear Valley and receives water from CLAWA. Typically, Rimforest's annual demand is approximately 60 afy, or 2 percent of DWP's total annual demand. DWP also has interconnections with Big Bear City Community Services District (BBCCSD) in order to transfer water in the event of an emergency shortage. These connections are for critical periods and are therefore not factored into demand projections.

Because Rimforest is essentially fully developed, demand volume is anticipated to remain relatively constant (Table 3.4).

Table 3.4 Projected CLAWA Purchases for Rimforest

	Annual Supply (afy)					
Supply Source	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
CLAWA	53	55	57	59	61	63
Total	**53**	**55**	**57**	**59**	**61**	**63**

Notes:

As with both population and demand projections, imported supply purchases for Rimforest are anticipated to grow at a rate of 0.7% annually

Rimforest's potable water demand will be supplied entirely through imported water from CLAWA and is anticipated to remain relatively constant at 60 afy through year 2035.

3.4 RECYCLED WATER

The DWP does not have a recycled water system. BBARWA provided water in the past as part of an experimental program. Recycled water is currently not available. More details of the region's recycled water system are discussed in Chapter 4.

3.5 DESALINATED WATER

Opportunities for future desalinated water supplies are discussed at the end of Chapter 7.

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Chapter 4

RECYCLED WATER

In accordance with the UWMPA, this chapter includes information on water recycling and its potential for use as a water source for the DWP.

> *10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:*
>
> *10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*
>
> *10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.*
>
> *10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse determination with regard to the technical and economic feasibility of serving those uses, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.*
>
> *10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.*
>
> *10633 (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.*
>
> *10633 (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.*

4.1 COLLECTION AND TREATMENT SYSTEMS

Wastewater collection systems within the service area for the DWP are operated by the City of Big Bear Lake, BBCCSD, and the County of San Bernardino County Service Area 53B. The collection systems deliver wastewater to BBARWA's interceptor system. BBARWA was formed in March 1974 and its service area includes the entire 79,000 acres of Bear Valley. BBAWRA operates three main lines; the low pressure sewer (LPS) force main that services the City's wastewater system, the North Shore Interceptor that services the county's wastewater system, and the BBARWA Trunk Line that services the BBCCSD's wastewater system and conveys flow from the North Shore Interceptor to the treatment plant. Wastewater flows from the three main lines is conveyed to the BBARWA treatment plant located on a 94-acre parcel near Baldwin Lake in Big Bear City (ER, 2010).

The plant occupies about 11.2 acres, leaving 82.3 acres for evaporation ponds and other purposes. The plant has a peak hydraulic capacity of 9.1 million gallons per day (mgd), a

secondary wastewater treatment capacity of 4.9 mgd and, as of 2010, is operating at about 2.5 mgd (ER, 2010).

Table 4.1 Current and Projected Wastewater Collection and Treatment by BBARWA

	Projected Annual Flow (afy)					
Type of Wastewater	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wastewater Collected and Treated in BBAWRA Service Area(1)	3,114	3,237	3,361	3,484	3,607	3,730
Wastewater volume collected and treated from DWP's service area(2)	1,926	1,996	2,069	2,145	2,224	2,305
Wastewater volume collected and treated from DWP's service area that meets Recycled Water Standard(3)	0	0	0	0	0	0

Notes:
(1) Based on 2010 to 2030 projections presented in BBARWA 2010 Master Plan linearly interpolated for intermediate years
(2) Based on BBAWRA, City, and Fawnskin service areas collection and treatment data for 2010, while 2015 through 2035 are based on 62% of the total regional flows
(3) Neither DWP nor BBAWRA have future plans to implement recycled water usage

Total wastewater flows for BBARWA are projected to increase gradually by approximately 600 af over the next 25 years. In their 2010 Master Plan, BBARWA reports that DWP's service area accounts for approximately 62 percent of BBARWA flows. This 62 percent factor was then used to project all future flows for the DWP service area based on BBARWA flow projections (ER, 2010).

No water is predicted to meet recycled water standards. There are currently no plans for BBARWA to produce recycled water, and the DWP has no plans to incorporate recycled water during this planning period.

4.1.1 Disposal of Non-Recycled Wastewater

Currently, BBARWA discharges the secondary wastewater treatment plant effluent to a 480-acre site in Lucerne Valley where it is used to irrigate feed crops. The sludge is collected, dewatered, and hauled to disposal facilities. BBARWA is permitted to discharge treated wastewater for irrigation, construction compaction, dust control, and wildland firefighting in the Valley (CDM, 2005).

4.2 CURRENT RECYCLED WATER USES

Recycled water is not available and is not currently utilized in the DWP's service area.

4.3 POTENTIAL USES AND PROJECTED DEMAND

Because the DWP's customer base is primarily residential connections with limited landscaping, uses and demand for non-potable water is low. Furthermore, because Lucerne Valley is utilizing the secondary treated effluent, there is currently little need for recycled water in the DWP's service area.

In the DWP's 2006 Water Master Plan, it was speculated that recycled water would best be utilized by the DWP for groundwater replenishment. These findings were echoed in the DWP's *Reconnaissance Analysis of Alternative Water Sources* document (DWP 2010).

Table 4.2 Potential Future Recycled Water Use (DWP 2010)

User Type	Treatment Level	Potential Recycled Water Demand (afy)
Groundwater/Bear Creek/Bear Lake Recharge	Advanced Water Purification(1)	500 - 2,000
Snowmaking	Advanced Water Purification(1)	1,100
Golf Course Irrigation	Advanced Water Purification(1,2)	120

Notes:
(1) Secondary wastewater treatment, microfiltration, reverse osmosis, ultraviolet disinfection, and advanced oxidation.
(2) Due to public concern regarding possible contamination of the small Rathbone groundwater subunit, advanced purification may be necessary

Thus, groundwater or surface water replenishment are the primary projected uses of recycled water in the DWP's service area. It was estimated that recycled water could potentially enhance the DWP's water supply by up to 1,000 afy.

Similarly, recycled water could be used to enhance Bear Creek. Another application for recycled water is snowmaking, which is currently being taken from Big Bear Lake. Finally, recycled water could be used to irrigate the Bear Mountain Golf Course, which currently irrigates with groundwater. This would allow the DWP to increase its pumping from the Rathbone Hydrologic Subunit.

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Chapter 5

WATER DEMAND

5.1 GENERAL

The UWMPA requires that UWMPs identify the agency's water demand and include a breakdown by user classification.

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the- following uses:
>
> (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.
>
> (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

5.2 PAST, CURRENT, AND PROJECTED WATER USE

This section describes the historical, current, and projected water use through year 2035. It also describes the types of customer accounts in the DWP's service area.

5.2.1 Customer Accounts

As of 2010, the DWP maintains 15,738 water meters, in which 14,904 are residential and 838 are commercial. Thus, about 95 percent of the accounts are residential (Figure 5.1).

This ratio was used for projecting into the future. Multi-family residential accounts are grouped in commercial accounts.

5.2.2 Historical Water Use

The historical water use varied from 110 to 77 gpcd. Water demand began dropping in 2002, most likely due to water conservation efforts by the DWP. Per capita consumption continues to decrease gradually.

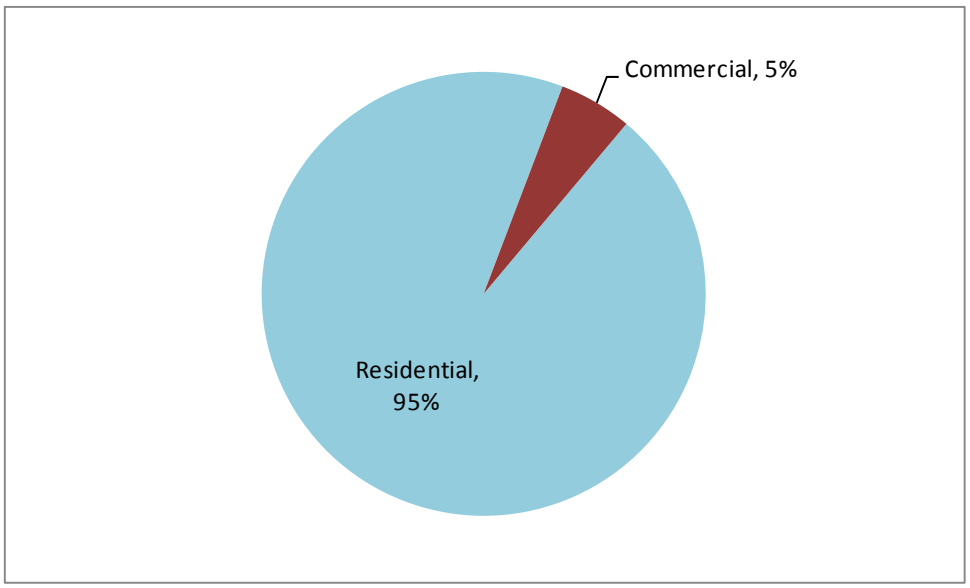


Figure 5.1 Breakdown of Accounts by Account Type

Table 5.1 Historical Water Use

Year	Average Annual Population[(1)]	Water Demand (afy)	Per Capita Consumption (gpcd)
1995	23,754	2,624	99
1996	23,922	2,658	99
1997	24,090	2,719	101
1998	24,260	2,766	102
1999	24,431	2,828	103
2000	24,604	2,999	109
2001	24,777	3,044	110
2002	25,290	2,948	104
2003	25,667	2,655	92
2004	24,946	2,667	95
2005	25,220	2,514	89
2006	25,307	2,547	90
2007	25,529	2,736	96
2008	25,397	2,483	87
2009	25,426	2,374	83
2010	25,462	2,205	77
Average	**24,880**	**2,673**	**96**

Notes:

(1) Since annual population estimates for the DWP service area were not available, historic population estimates were calculated from the number of service connections for each year between 2001 and 2010. A benchmark of the year 2010 was used based on U.S. Census data (USCB, 2010). Average annual population includes an adjustment for seasonal population as discussed in Chapter 2.

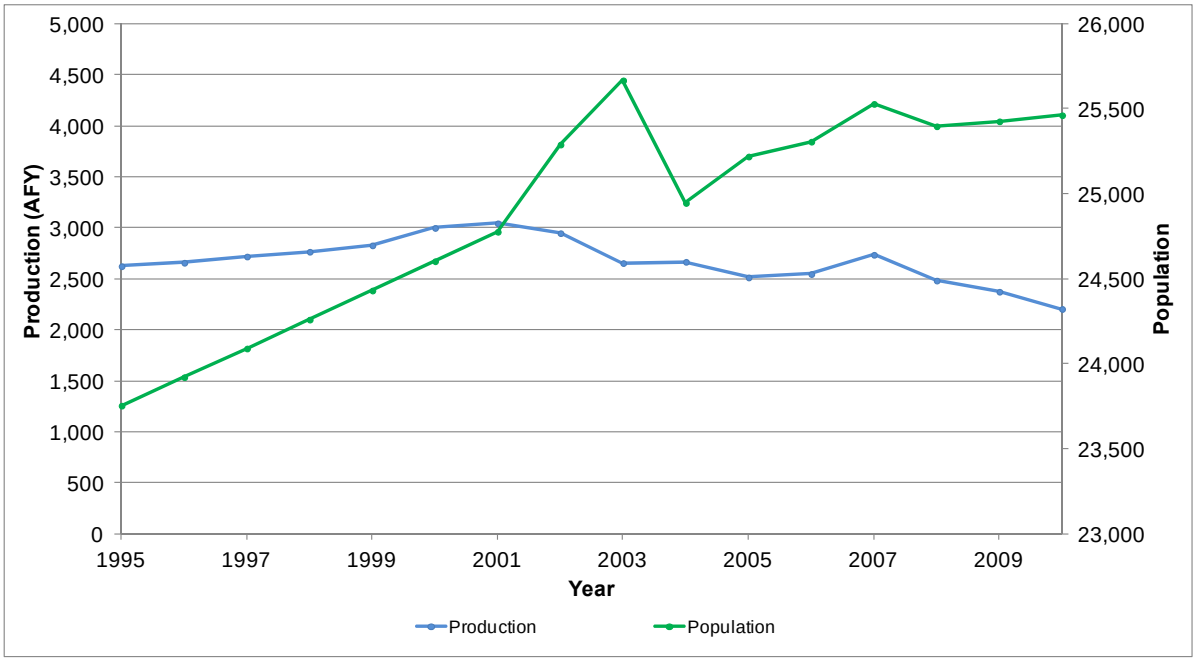


Figure 5.2 Production and Population Over Time

5.2.3 Current Water Use

The per capita consumption is the average amount of water consumed per person per day. This consumption is calculated by dividing total water production by population and 365 days.

In 2010, the DWP supplied 2,205 af of potable water to its customers, which is equivalent to 2 mgd. With a 2010 population of 25,462, the average per capita consumption was 77 gpcd.

The 2010 per capita consumption rate was used in combination with the population projections (see Chapter 2) to estimate the DWP's future water demand. Projected demand was used to evaluate the adequacy of DWP's water supply. Overall, the population has grown gradually while demand has declined.

5.2.4 Projected Water Use

Based on the projected trends in population and historical consumption rates, DWP's projected future water demand was estimated and summarized in Table 5.2 and Figure 5.3. The demand projection is based on a 0.7% growth rate beginning in 2010.

Projected per capita water use for 2020 meets the requirements established in SB-7x7.

Table 5.2 Demand Projections

Year	Average Annual Population[(1)]	Per Capita Consumption (gpcd)	Demand (afy)
2010	25,462	77	2,205
2015	26,366	77	2,283
2020	27,302	77	2,364
2025	28,271	77	2,448
2030	29,274	77	2,535
2035	30,313	77	2,625

Notes:
1. Population projections from Table 2.2

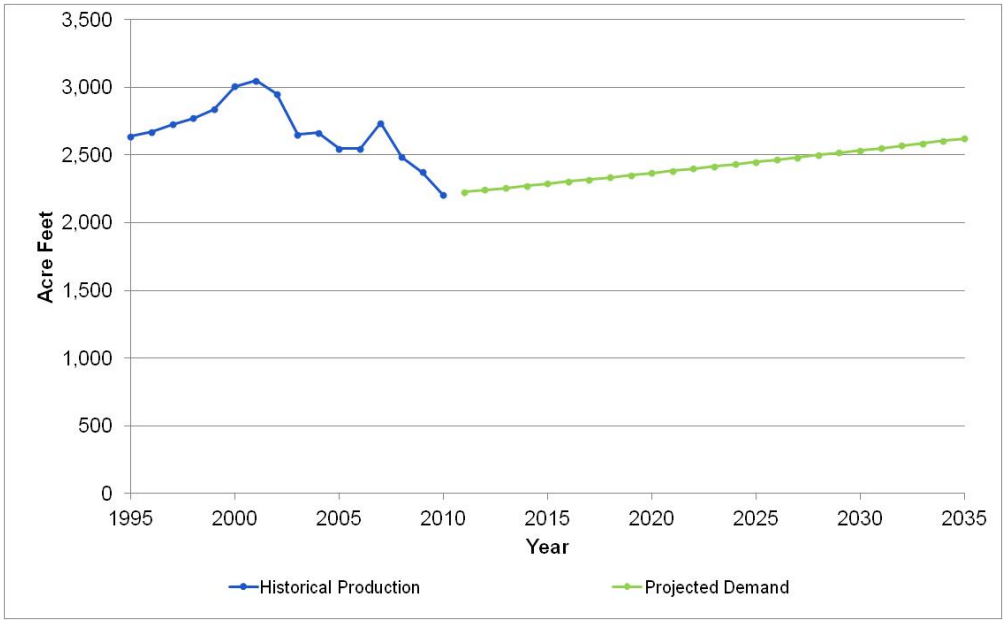


Figure 5.3 Past, Current, and Projected Water Use

5.3 WATER USAGE BY CLASSIFICATION

Projected water deliveries by customer class are summarized in Table 5.4. There are no unmetered accounts in the DWP service area. Average system water loss is 9.7 percent.

5.4 LOW-INCOME HOUSING

The UWMPA requires that the UWMP identify planned low-income housing developments within the agency's service area and develop demand projections for those units.

> 10631.1(a). The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier

The City's General Plan (GP, 2008) provides information on Regional Housing Needs Allocation progress (RHNA). The Housing Element of the General Plan identified the need to construct 57 extremely low-income, 56 very low-income, and 80 low-income housing units between 2006 and 2014.

The 2008 General Plan Update did not provide information on single-family versus multi-family low income dwelling units, so the average number of people per dwelling unit was assumed to be the same as the rest of the City at 2.4 people per dwelling unit. Assuming that these 193 dwelling units reflect an average of 2.4 people per dwelling unit and the projected per capita water usage of 77 gpcd, the total demand associated with low-income housing is estimated to be 40 afy. Since the General Plan does not indicate any additional need for low-income housing beyond year 2014, the projected demand after 2015 is assumed to remain constant through year 2035.

Table 5.3 Low-Income Projected Water Demands

	Demand (afy)				
	2015	**2020**	**2025**	**2030**	**2035**
Low-Income Housing[(1)]	40	40	40	40	40

Table 5.4 Water Demand Projections by Customer Class								
	2005		2010		2015		2020	
Customer Class	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)
Single-Family	14,758	1,584	14,900	1,437	15,429	1,488	15,976	1,541
Multi-family	-	-	-	-	-	-	-	-
Commercial	608	710	838	554	868	574	899	594
Industrial	-	-	-	-	-	-	-	-
Government	-	-	-	-	-	-	-	-
System Losses(2)	-	244	-	214	-	221	-	229
Total	**15,366**	**2,514**	**15,738**	**2,205**	**16,297**	**2,283**	**16,875**	**2,364**

Notes:

(1) Future account breakdown is a based on average account breakdown.

(2) System losses based on historic average of 9.7 percent.

Table 5.4 Water Demand Projections by Customer Class (Continued)						
	2025		2030		2035	
Customer Class	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)
Single-Family	16,544	1,596	17,131	1,652	17,739	1,711
Multi-family	-	-	-	-	-	-
Commercial	930	615	963	637	998	660
Industrial	-	-	-	-	-	-
Government	-	-	-	-	-	-
System Losses(2)	-	237	-	246	-	255
Total	**17,474**	**2,448**	**18,094**	**2,535**	**18,736**	**2,625**

Notes: (see above)

5.5 DEMAND PROJECTIONS AND WATER CONSERVATION

The projected water demand, with and without the target water conservation is graphically depicted in Figure 5.4. Demand is not predicted to exceed maximum allowable demand.

Table 5.5 Demand Projections

Year	Average Annual Population[1]	Projected Demand[2] (afy)	Maximum Allowable Demand to meet SB-7x7 Conservation Target[3] (afy)
2010	25,462	2,205	4,050
2015	26,366	2,283	4,637
2020	27,302	2,364	4,343
2025	28,271	2,448	4,497
2030	29,274	2,535	4,657
2035	30,313	2,625	4,822

Notes:

(1) Population Projections from Table 2.1.

(2) Demand projections based on 2010 average consumption of 77 gpcd.

(3) Conservation requirements based on an average per capita demand of 142 gpcd combined with average annual population estimates. Data represents maximum possible production that will still result in the DWP meeting state conservation requirements given population projections.

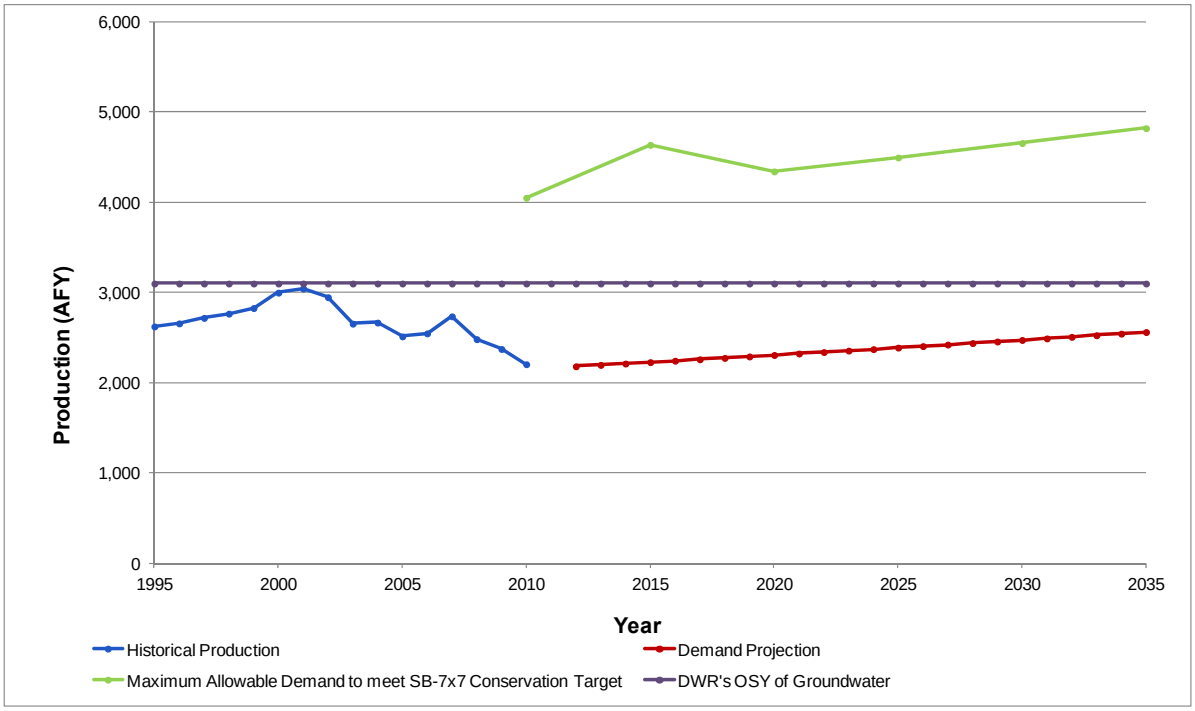


Figure 5.4 Projected Water Demands

The maximum allowable water demand, for the DWP, based on water conservation Method 3, was substantially higher than the projected water demand for the DWP. Hence, the DWP

will meet the SB-7x7 requirements by maintaining its current per capita consumption of 77 gpcd.

Chapter 6

WATER CONSERVATION

The UWMPA requires that the UWMP involve a discussion of the agency's water conservation measures. This includes an overview of the supplier's BMPs as well as a discussion of how the supplier intends to meet the water conservation targets established by SBx7-7.

> 10608.20. (a) (1) Each urban retail water supplier will develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis. (2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020

6.1 WATER CONSERVATION

6.1.1 Water Conservation Target Methods per SBx7-7

SBx7-7 requires that all water suppliers increase water use efficiency by decreasing per capita consumption by 20 percent by year 2020. The DWR provided four different methods to establish water conservation targets. These four methods can be summarized as follows.

- **Method 1 – Baseline Reduction Method.** This method is defined as a 20 percent reduction of average per capita demand during a 10-year baseline period ending between 2005 and 2010.
- **Method 2 – Efficiency Standard Method.** This method is based on calculating efficiency standards for indoor use separately from outdoor use for residential sectors and an overall reduction of 10 percent for commercial, industrial, and institutional (CII) sectors. The aggregated total of the efficiency standards in each area is then used to create a conservation target.
- **Method 3 – Hydrologic Region Method.** This method uses ten regional urban water use targets. Based on the water supplier's location, the regional water conservation target for 2015 and 2020 must be met.
- **Method 4 – BMP-based Method.** This method uses previous BMPs of the supplier to establish a conservation target for 2020. Depending on how aggressively the water supplier has pursued water reduction and conservation in the past, a new conservation target for 2020 is calculated.

6.1.2 Method 1

Method 1 establishes a 10-year and 5-year baseline water consumption in gpcd based on historical population and demand numbers. Any 10-year period from 1995 and 2010 (but it

cannot end before December 31, 2004) can be selected to establish the baseline per capita demand for the water supplier using the average per capita consumption in gpcd. If an agency used 10 percent or more recycled water in year 2008, the baseline value can also be determined with a 15-year consecutive period between 1990 and 2010. Since the DWP did not utilize recycled water for more than 10 percent of their 2008 demand, the baseline period must be 10 years in length and end between December 31, 2004 and December 31, 2010. A 5-year period needs to be selected in any year ending no earlier than 2007 to determine the minimum required reduction in water use. The baseline value is then reduced by 20 percent to determine the year 2020 conservation target. The intermediate target for year 2015 is the mid-point value between the baseline and year 2010 target values.

Table 6.1 Base Period Ranges

Base	Parameter	Value	Units
Water Deliveries	2008 total water deliveries	2,483	af
	2008 total volume of delivered recycled water	0	af
	2008 recycled water as a percent of total deliveries	0	%
10-year Base Period	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Table 6.1 shows the characteristics of the 10- and 5-year periods selected as the baselines for the DWP. The 10-year period with the highest baseline consumption starts in 1995 and ends in 2004 (Figure 6.1).

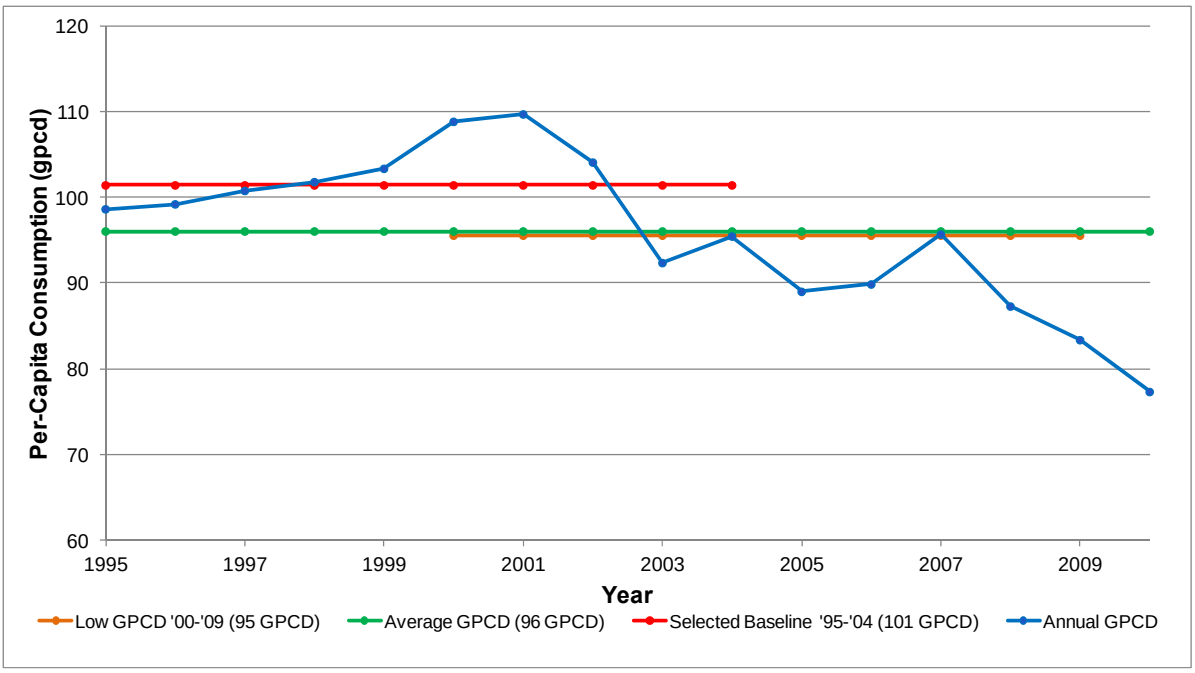


Figure 6.1 Minimum, Average, and Maximum 10-Year Baseline Consumption

Although the yearly per capita demand varies significantly between 1995 and 2010, the high-average value, low-average value, and 16 year historical average are all relatively close in value. Although recent per capita demand values have declined compared to previous years, this is likely due to the economic downturn as well as aggressive conservation outreach efforts by the DWP.

Table 6.2 Daily Per Capita Water Use, 10-Year Range: 1995-2004

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1995	23,754	2.3	99
Year 2	1996	23,922	2.4	99
Year 3	1997	24,090	2.4	101
Year 4	1998	24,260	2.5	102
Year 5	1999	24,431	2.5	103
Year 6	2000	24,604	2.7	109
Year 7	2001	24,777	2.7	110
Year 8	2002	25,290	2.6	104
Year 9	2003	25,667	2.4	92
Year 10	2004	24,946	2.4	95
Average	**n/a**	**24,574**	**2.5**	**101**

Table 6.2 shows the DWP population, total volume of consumption, and per capita consumption of the selected 10-year baseline period. The average per capita consumption

during this period was 101 gpcd. Based on Method 1, a 20 percent reduction from this baseline period would be 81 gpcd.

Table 6.3 shows the population, total average daily system demand, and the per capita consumption of the 5-year baseline period, 2003 to 2007, was 92 gpcd. The 5-year baseline value is used to determine the minimum required reduction in water use.

Table 6.3 Daily Per Capita Water Use, 5-Year Range: 2003-2007

Base Period Year		Distribution System Population	Average Daily System Demand (mgd)	Average Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	25,667	2.4	92
Year 2	2004	24,946	2.4	95
Year 3	2005	25,220	2.2	89
Year 4	2006	25,307	2.3	90
Year 5	2007	25,529	2.4	96
Average		**25,334**	**2.3**	**92**

The minimum per capita consumption for year 2020 is defined as 95 percent of the 5-year gpcd. This establishes the minimum water conservation target at 88 gpcd.

Since the water conservation target derived from 95 percent of the 5-year baseline period (88 gpcd) is higher than the Method 1 2020 water conservation target (81 gpcd), the DWP's Method 1 water conservation targets are as follows:

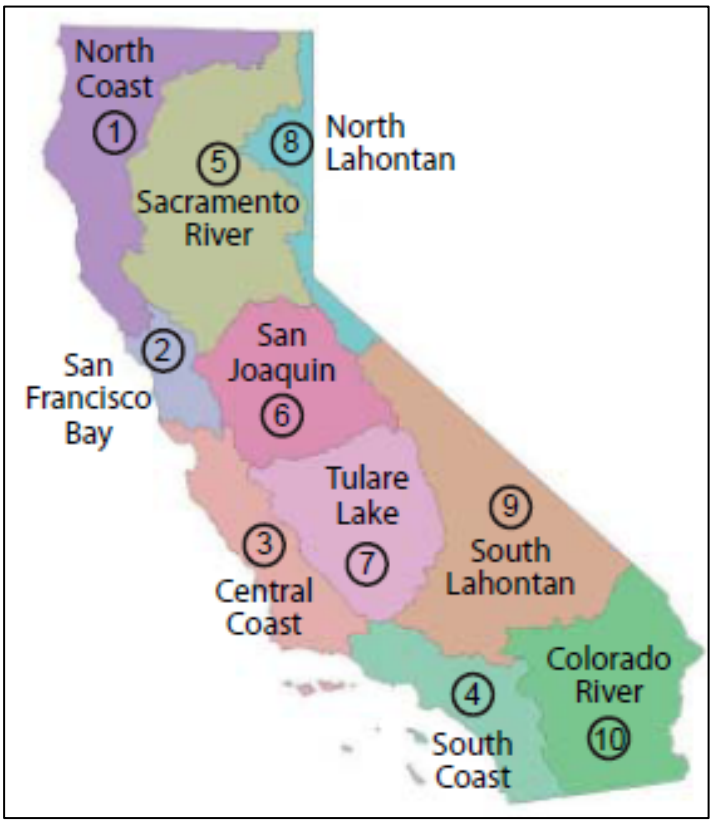
- Year 2015 Target: 91 gpcd
- Year 2020 Target: 81 gpcd

6.1.3 Method 2

Sufficient data to calculate Method 2 for DWP was not available since the effort associated with digitizing or surveying the amount of irrigated landscape within the DWP's service area would be significant.

6.1.4 Method 3

The State's 20 by 2020 water conservation plan has identified specific urban water use targets for 2015 and 2020 for each of the ten hydrologic regions shown in Figure 6.2. The DWP falls in Hydrologic Region 4 (South Coast) which has a target use of 142 gpcd for year 2020.



In most circumstances, all four methods require to be checked to ensure that the 2020 goal reduces consumption to at least 95 percent of the 5-year baseline daily water consumption calculated in Method 1. This would result in a required gpcd of much lower than the 142 gpcd target for Method 3. However, if the 5-year baseline daily per capita use falls below 100 gpcd, then no adjustment to the water use target is needed. Therefore, the Method 3 hydrologic region goal may be adopted without further calculation.

The DWP's water conservation targets using Method 3 are as follows:

- Year 2015 Target: 157 gpcd
- Year 2020 Target: 142 gpcd

6.1.5 Method 4

Method 4 uses the supplier's BMP reports as a guide to set the 2020 conservation target. The intent behind Method 4 is to use the BMP reports to account for what water conserving measures the supplier has already taken in order to set an accurate and realistic target for the future and take into consideration the supplier's previous water conservation efforts.

At this time, the DWP has inadequate records on BMP practices to implement Method 4.

6.1.6 Recommended Method

The water conservation targets for each are presented in Table 6.4. Method 3 will provide the DWP with the optimal conservation goal.

Table 6.4 Conservation Method Overview

Conservation Calculation	Conservation Target (gpcd)		Reduction by 2020	
	Year 2015	Year 2020	From Baseline(1)	From 2010 Usage(2)
Method 1	91	81	-20%	+5%
Method 2	n/a	n/a	n/a	n/a
Method 3	157	142	+41%	+84%
Method 4	n/a	n/a	n/a	n/a

Notes:
1) Baseline consumption is 101 gpcd
2) 2010 consumption is 77 gpcd

6.1.7 Demand Projections with Water Conservation

Table 6.5 presents DWP demand projections with and without water conservation targets. The demand projections in afy were derived from the population projections presented in Chapter 2 and the per capita consumption targets described above.

Table 6.5 Demand Projections

Year	Projected Demand (afy)	Maximum Allowable Demand to meet SB-7x7 Conservation Target (afy)
2010	2,205	4,050
2015	2,283	4,637
2020	2,364	4,343
2025	2,448	4,497
2030	2,535	4,657
2035	2,625	4,822

Notes:

(1) Population Projections are taken from Table 2.2.

(2) Non-conservation projections are based on population growth combined assuming continuing per-capita demands of 77 gpcd. Maximum Water Demand per Conservation Targets are based on Method 3 conservation target consumption of 142 gpcd for 2020.

As shown in Table 6.5 and graphically in Figure 6.3, water conservation requirements of SBx7-7 show DWP's projected demands to be below the maximum water demand based on the conservation targets.

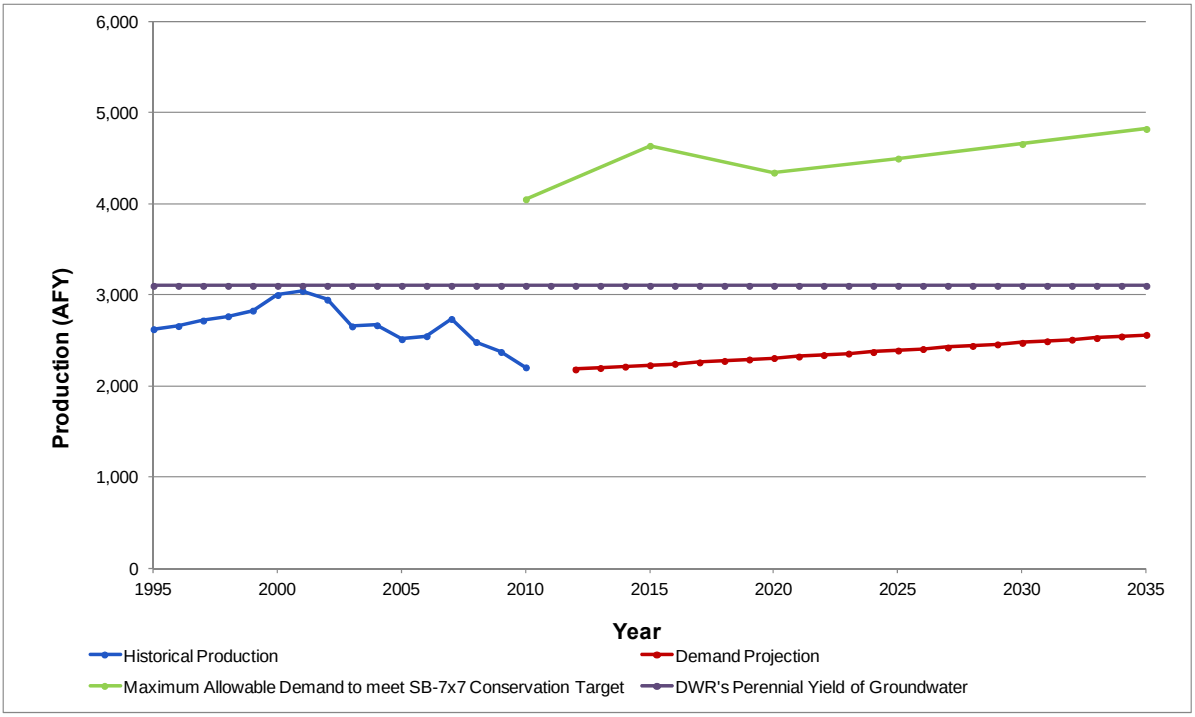


Figure 6.3 Projected Water Demands with and without Conservation

The allowable water demand is substantially higher than the projected water demand for the DWP. Hence, the DWP is projected to meet the SB-7x7 requirements by maintaining its current per capita consumption of 77 gpcd.

6.2 BEST MANAGEMENT PRACTICES

The DWP is a member of the California Urban Water Conservation Council (CUWCC) and is therefore a signatory to the Memorandum of Understanding (MOU) regarding urban water conservation in California. The DWP became a signatory to the MOU in December 2004. The BMPs are conservation practices established by the CUWWC and detailed in conferences, BMP workshops, and free publications. The UWMPA requires that the UWMP discuss the agency's water conservation measures.

> 10631 (F) Provide a description of the supplier's water demand management measures. This description will include all of the following:
>
> (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
>
> (A) Water survey programs for single-family residential and multi-family residential customers.
>
> (B) Residential plumbing retrofit.
>
> (C) System water audits, leak detection, and repair.
>
> (D) Metering with commodity rates for all new connections and retrofit of existing connections.
>
> (E) Large landscape conservation programs and incentives.
>
> (F) High-efficiency washing machine rebate programs.
>
> (G) Public information programs.
>
> (H) School education programs.
>
> (I) Conservation programs for commercial, industrial, and institutional accounts.
>
> (J) Wholesale agency programs.
>
> (K) Conservation pricing.
>
> (L) Water conservation coordinator.
>
> (M) Water waste prohibitions.
>
> (N) Residential ultra-low-flush toilet replacement programs.

The DWP plans to address all of the BMP targets listed in the CUWCC MOU except where mentioned below. BMP Number 10 applies only to wholesale agencies and is not reported in this plan. The DWP has continually made efforts to meet all BMP requirements but has not submitted the 2009-2010 BMP reports and is therefore out of compliance. The DWP realizes the importance of the BMPs to ensure a reliable future water supply. The DWP's 2005 UWMP provided information regarding conservation measures already in place and those that would improve the efficiency of water use within the service area.

While the CUWCC has re-classified the BMPs, the numbered classification system will be used in this discussion since the DWP's efforts have been categorized accordingly (Table 6.6).

Table 6.6 Best Management Practices

Best Management	Implemented	Planned for Implementation	Not Applicable
BMP 1 - Water Survey Programs	✓		
BMP 2 - Residential Plumbing Retrofit	✓		
BMP 3 - Water System Audits	✓		
BMP 4 - Metering with Commodity Rates	✓		
BMP 5 - Landscape Irrigation Programs	✓		
BMP 6 - Washing Machine Rebate Program		✓	
BMP 7 - Public Information Program	✓		
BMP 8 - School Education Program		✓	
BMP 9 - Commercial, Industrial, and Institutional Conservation Programs	✓		
BMP 10 - Wholesale Agency Programs			✓
BMP 11 - Conservation Pricing	✓		
BMP 12 - Water Conservation Coordinator	✓		
BMP 13 - Water Waste Prohibition	✓		
BMP 14 - Ultra-Low-Flush Toilet Replacement	✓		

6.2.1 BMP 1 - WATER SURVEY PROGRAMS

This program consists of offering water audits to single-family and multi-family residential customers. Audits include reviewing water usage history with the customer, identifying leaks inside and outside the home, and recommending improvements.

The DWP is currently conducting targeted and untargeted residential surveys at no cost to the customer. The DWP contacts and conducts targeted water surveys of the top residential users in the system with a goal of contacting the top 20 percent of users. Untargeted surveys include customer requests and those generated as a result of the Retrofit on Change of Service program. These surveys are a cost effective means of getting customers to participate in the DWP's water-use efficiency campaign.

The DWP performs indoor audits by checking plumbing fixtures and outdoor audits by checking the landscaping and irrigation systems to make recommendations for improving the customer's water-use efficiency. If field personnel notice leaks or unusually high water consumption, they will leave a door tag alerting the customer to check for leaks. In addition, field personnel will also look for landscape ordinance and water use regulation violations, and issue a door tag if a violation is observed.

By 2005, the DWP had completed 455 surveys. Between 2006 and 2010, the DWP conducted an 635 indoor and 164 outdoor residential audits.

6.2.2 BMP 2 - RESIDENTIAL PLUMBING RETROFIT

This program traditionally consists of installing physical devices to reduce the volume of water used in accordance with State law, low-flow fixtures have been required on all new construction since 1978. In addition, the State requires all new buildings to install ultra-low-flush toilets (ULFT). The DWP provides indoor audits, low-flow bathroom aerators, and low-flow showerheads at no cost.

A BMP requirement is to obtain 75 percent saturation of single-family residences retrofittings, it was calculated that 9,750 homes would need retrofitting. For multi-family residences, 315 would need retrofitting. The goal of the DWP is to complete 10,000 retrofits by 2015. Assuming two bathrooms per residence, 20,000 showerheads and conservation kits would need to be distributed.

Water savings based on installing low-flow showerheads, faucet aerators, and toilet displacement devices was estimated by the CUWCC to be 5.5 gallons per day (gpd), 1.5 gpd, and 4 gpd respectively. All three devices are generally distributed concurrently, so for the purposes of this BMP the total estimated water savings is based on the cumulative savings of 11 gallons per day.

From 1992 to 2005, the DWP has distributed approximately 13,800 showerheads and water conservation kits, reaching approximately 69 percent of the total single and multi-family residences. This was determined by comparing the number of low-flow devices distributed to single and multi-family residences by the DWP to the number of accounts prior to 1992. Since 2006, the DWP has distributed 3,000 bathroom aerators and 4,000 showerheads.

The DWP instituted a Retrofit on Change of Service program, Resolution No. DWP 2007-08, in April 2007 (see Appendix F). This resolution requires that all faucets and showerheads have flow rates of 2.5 gallons or less and toilets have a volume of 1.6 gallons per flush or less. Property owners must inspect fixtures to ensure compliance and provide a signed certificate to the DWP. From 2005 to 2010, the DWP has provided a $100 rebate per toilet for up to two toilets.

6.2.3 BMP 3 - SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR

A water audit is a process of accounting for water use throughout a water system in order to quantify unmetered water usage. Unaccounted-for-water is the difference between metered production and metered usage on a system-wide basis.

The DWP conducts regular mass balance audits of metered water production versus metered water sales to detect unusual changes in the water operation. The goal is to minimize water losses and increase overall system efficiencies.

The DWP performed a full water system audit in 2001, when 167 miles of the distribution system was surveyed. The DWP has been active in locating and repairing leaks, and responding immediately to repair leaks. Field personnel are trained to recognize potential service and main line leaks. Pipelines with chronic leak problems are replaced.

When the DWP purchased the system from Southern California Water Company in 1989, the percent of unaccounted-for-water was 29.6 percent. At that time, the DWP applied for and obtained a low-interest loan from the State of California, and began a significant leak detection and repair program. Between 1990 and 2000, the DWP replaced over 108,000 feet (20.5 miles) of the leakiest pipes in the system, reducing the unaccounted-for-water from 29.6 to 11.05 percent. Recent records show a 9.7 percent unaccounted-for-water loss, which is typical for Southern California water agencies.

The DWP will continue conducting system water audits, leak detection, and repairs.

6.2.4 BMP 4 - METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

This BMP requires water meters for all connections, new and existing. Beginning in 1989, the DWP required water meters for all new and existing services, upon a change of ownership, as well as all consumers who used large quantities of water. The last non-metered account was changed to a metered account in 2003. All connections within the DWP service area are currently metered and customers are billed for usage. The DWP considered implementing a program that provided incentives to exchange mixed-use accounts to install dedicated landscape meters, but determined such a program would not be cost effective. The DWP found it more cost effective and water efficient to pursue a total reduction in heavily irrigated landscapes, which was accomplished through a landscape ordinance (see Appendix F) and a Turf Buy-Back Program.

6.2.5 BMP 5 - LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES

BMP 5 calls for agencies to start assigning water budgets based on a reference evapotranspiration rate (ETo) based water budgets to accounts with dedicated irrigation meters and to provide water use audits to accounts with mixed use meters. Landscape surveys are performed by the Water Conservation Specialist or Technician on request. During these surveys, the Specialist or Technician examines the sprinkler system, landscaping, and makes recommendations for improving water use efficiency. In 2005, the DWP began performing and tracking outdoor irrigation audits. From 2005 to 2010, 164 outdoor audits were performed.

At present, the DWP has very few customers with irrigation meters and has not assigned water-use budgets to any of these accounts. The DWP provides a number of incentives to encourage landscape water use efficiency. In 2005, a Turf Buy-Back Program was implemented in which the DWP reimbursed customers who voluntarily removed turf from

their property. Under this program, the reimbursement rate was and is $0.50 per square foot for landscapes with more than 500 square feet of turf. The program has resulted in the removal of 268,141 square feet of turf grass from 2005 to 2010.

Through the DWP's tiered pricing structure, customers are encouraged to minimize landscape water use in order to avoid the high water bills. New customers, and those changing service, are notified of the landscape water use regulations.

The CUWCC's requirements state that no less than 20 percent of CII accounts with mixed-use meters should be contacted each year and offered a landscape water use survey. The DWP began implementing this program in 2004, offering its commercial account customers the opportunity to have landscape surveys.

Ordinance No. 2005-348 (see Appendix F) was approved in 2005 alongwith Resolution No. DWP 2005-02, which included planning and installation of appropriate water-conserving landscapes within the DWP service area. Water use policies and requirements pertaining to landscaping and water conservation include:

- Customers are encouraged to use native and water-conserving plants for landscaping.
- Customers are required to minimize the use of turf at all new and retrofitted commercial and residential landscapes.
- The DWP requires and promotes development of water conservation plans for all customers whose water use exceeds reasonable guidelines developed by the DWP.
- The DWP requires repair of all leaks, once they are detected.
- All outdoor irrigation systems must be shut off and winterized between November 1st and April 1st annually.
- The DWP will establish reasonable water use and irrigation standards for all residential and commercial customers in its service area

The ordinance also included new requirements for the submission of landscape plans, penalties for failure to comply, and an appeal process. This ordinance applies to new construction, or renovation of existing properties. These requirements are not retroactive to existing residents and customers.

6.2.6 BMP 6 - HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAM

This program provides financial incentives (rebate offers) to qualifying customers who install high-efficiency washing machines in their homes. The DWP does not presently have a high-efficiency washing machine rebate program, but instead the DWP has an ordinance

requiring the use of high-efficiency washing machines in new construction. This provision is part of DWP's water waste prohibition.

There are potential water savings limitations associated with the implementation of a high-efficiency washing machine rebate program. Since 70 percent of the homes in the DWP's service area are vacation or second homes, the water savings estimated would be realized by the 30 percent that are full-time residents. In addition, there is a concern that once the rebate is received from the DWP for the washing machine, the customer could remove the machine and reinstall it in their primary home outside the DWP service area, resulting in no water savings for the DWP. Additionally, since so many homes are vacation and second homes, those homes commonly do not have washing machines at all. The DWP may implement a high-efficiency washing machine rebate program in the future, once it has exhausted the available ULFT, showerhead, and faucet aerator retrofits.

6.2.7 BMP 7 - PUBLIC INFORMATION PROGRAMS

The DWP maintains an active public information program, administered by the Public Information/Water Conservation Specialist. It is designed to educate the public and businesses on water supply issues and conservation through a variety of means. These include local newspapers and radio advertisements, restaurant table cards, hotel door hangers, business placards, and an informative website.

6.2.8 BMP 8 - SCHOOL EDUCATION PROGRAM

This BMP requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance. The DWP currently has no school education program but is planning to re-institute water education programs for fourth graders in all three elementary schools in its service area. This program was implemented intermittently until 2009.

6.2.9 BMP 9 - CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ACCOUNTS

The DWP has not implemented a formal conservation program for its CII accounts. There are no industrial accounts in the DWP system. The DWP included commercial accounts in several implemented conservation programs. Large landscape conservation programs and incentives were provided to CII customers. ULFT replacements and bathroom retrofits have been provided to CII customers as well.

CUWCC's guidelines call for 10 percent of CII accounts to be surveyed in 10 years. As of 2005, there were 525 commercial accounts and 39 institutional accounts. The guidelines also suggest that 10 percent of all commercial customers be contacted each year with an offer to have a water use survey performed. The survey must include a site visit, evaluation of water using apparatuses and processes, and a report to the customer identifying

recommended efficiency measures. A follow-up visit is to be held one year after the survey. From 2006 to 2010, the DWP conducted 10 commercial audits.

Savings are based on the types of conservation measures available for implementation. The CUWCC estimates a water savings of approximately 12 percent following a water survey.

6.2.10 BMP 10 - WHOLESALE AGENCY PROGRAMS

The DWP is not a wholesale agency.

6.2.11 BMP 11 - CONSERVATION PRICING

The DWP applies a tiered rate structure to all residential connections.

Table 6.7 Bi-monthly Rate Structure

Bi-monthly Consumption (hcf)	Tier	Rate/hcf
9-24	One	$2.45
25-40	Two	$3.40
41-60	Three	$5.07
61-100	Four	$8.36
100+	Five	$11.61
4+	Commercial Rate	$3.51
1+	Rimforest	$4.83

Notes: Rates are current as of May 2012 and available at: http://www.bbldwp.com/

Commercial and Rimforest customers pay a flat rate. In addition to volume charges, a bi-monthly service charge is assessed based on meter size and varies from $81.32 to $96.24.

Table 6.8 Bi-Monthly Service Charge

User Type	Meter Size	Bi-Monthly Service Charge
Residential	5/8 inch meter	$81.32
Commercial	5/8 inch meter	$96.24
Rimforest	5/8 inch meter	$88.60

Notes: Rates are current as of May 2012 and available at: http://www.bbldwp.com/

6.2.12 BMP 12 - WATER CONSERVATION COORDINATOR

The DWP employs one full-time staff person as Public Information/Water Conservation Specialist and one seasonal Water Conservation Technician to manage the responsibilities of the water conservation program.

6.2.13 BMP 13 - WATER WASTE PROHIBITION

The DWP has approved resolutions to address water waste. These prohibitions are discussed further in Chapter 8.

6.2.14 BMP 14 - RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAMS

The DWP instituted an ULFT replacement program in 1999, which was briefly suspended in 2000 due to inadequate funding. The ULFTs were purchased by the DWP and installed by customers. A member of the DWP staff would confirm that a non-ULFT was being replaced and that a ULFT was actually installed. Other than installation costs, this program was free to the customers.

A toilet rebate program was then implemented in January 2004, providing customers a rebate of $75 per ULFT retrofitted. The purchase and installation of the UFLT was the responsibility of the customer. Prior to the installation, DWP conservation staff would verify that the existing toilet was a non-ULFT. The rebate was credited to the customer's account.

In August 2005, the DWP retrofitted high-flush toilets for free covering the cost of the toilet and installation. This project was funded by the City's Water Demand Offset Program, which required contractors and developers to pay a Water Demand Offset Fee based on the future demand of their respective developments.

The DWP calculated the water savings from toilet replacement to be 31 gallons per day per toilet. For purposes of this BMP, 31 gpd per toilet, or 0.0347 acre-feet per year per toilet will be used in both single- and multi-family dwellings. The cost per acre-foot of water savings is approximately $2,111 for toilet rebates and $6,700 for direct installs for the first year. Assuming a 20-year life for a toilet, the cost per acre-foot over the lifetime of the toilet comes out to $106 per acre-foot for rebates, and $335 per acre-foot for direct installs. While the cost per acre-foot for rebates is significantly cheaper than for direct installs, customer participation is much higher for direct installs, allowing more toilets to be retrofitted. The WDO fee was replaced in 2009 and funding for the toilet rebate program now comes from DWP's operations and maintenance budget.

Many homes in the DWP service area were built before 1992. Seventy percent of the homes in the Bear Valley are either vacation and/or second homes. Retrofitting ULFTs into these residences will result in significantly less water savings than if that same toilet was installed in a full-time residence. Therefore, the DWP qualifies customers for toilet rebates. Water usage must average 1.8 units per month over a 6-month period. Prior to installation,

DWP conservation staff performs an indoor audit to ensure the existing toilet is a non-ULFT. Once the toilet has been installed, the customer delivers a receipt or invoice to the DWP and the rebate is issued. The DWP will rebate the customer up to $100 per toilet, two toilets per household. Between 2005 and 2010, the DWP processed 628 toilet rebates.

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Chapter 7

WATER SUPPLY RELIABILITY

7.1 INTRODUCTION

UWMPs are required to address the reliability of the agency's water supply, seasonal and long-term supply vulnerability, and the affect of water quality on supply. Finally, vulnerabilities for a single-dry year and in multiple-dry years must be addressed.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.*
>
> *10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.*
>
> *10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.*
>
> *10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:*
>
> *10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.*
>
> *10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.*

7.2 WATER SUPPLY RELIABILITY

Ninety-eight percent of the DWP's current and future water supply is groundwater, and the current estimate of perennial yield available to the DWP is 3,100 afy.

7.3 FUTURE SUPPLY PROJECTS AND PROGRAMS

While no future supply projects are currently planned for the DWP, the DWP has identified and evaluated alternative water sources for its service area and determined that some local options have yet to be explored. Sixteen alternative water sources were evaluated in the *Reconnaissance Analysis of Alternative Water Sources* document (see Appendix D). The alternative sources were evaluated by potential volume supplied, capital costs, operations and maintenance costs, technical feasibility, and political feasibility.

Based on the study, four alternatives will be focused on in the next 10 to 20 years:

- maximizing extraction from each hydrologic subunit.
- Enhance groundwater recharge.
- Purchase excess water supply from BBCCSD.
- Utilize previously unused high fluoride wells belonging to BBCCSD through cooperative blending using DWP water.

Together, these four sources have the potential to increase the DWP's supply by several hundred acre-feet per year. A list of all potential projects investigated by the DWP can be found in the document.

7.4 FACTORS IMPACTING SUPPLY RELIABILITY

There are a variety of factors that can affect water supply reliability. The factors that might result in supply reliability issues for the DWP are indicated with an "X" in Table 7.1.

Table 7.1 Factors Resulting in Inconsistency of Supply

Water Supply Sources	Specific Source Name	Legal	Environmental	Water Quality	Climatic	Additional Information
Groundwater	Groundwater	-	-	X	X	-

7.4.1 Water Quality

The water quality within the Basin is generally good. The eastern part of the Basin is characterized by elevated fluoride. Other problem constituents include manganese, uranium, and arsenic. Water quality issues have resulted in occasional blending projects, water treatment plants, and wells being shut down. However, water quality issues are not anticipated to disrupt groundwater supply (DWR, 2004).

7.4.2 Climate

Where reliable climate change forecasts are not available for the San Bernardino Mountains, climate change is likely to add uncertainties to supply planning.

7.5 SUPPLY AND DEMAND COMPARISON

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

Two aspects of supply reliability were considered. The first relates to real-time demand and is primarily a function of the adequacy of the supply. The second aspect is climate-related, and involves the availability of water during drought periods or if there is a long-term reduction in precipitation. This section compares water supply and demand for three scenarios: normal year, single-dry year, and multiple-dry years.

- **Normal Year**:
  A normal year is a year that most closely represents median precipitation levels and patterns. Water supply quantities for this condition are represented by historical average yields.
- **Single-Dry Year**:
  This is defined as a year with minimum useable supply. The supply for this condition is derived by the minimum historical annual yield.
- **Multiple-Dry Years**:
  This is defined as the three consecutive years with the minimum useable supply. Water systems are more vulnerable to droughts of long duration, which deplete water supply reserves. The supply for this condition is defined from the minimum, recorded historical three year supply.

7.5.1 Methodology

In the event of single and multiple dry years, reduced rainfall results in lower groundwater recharge. However, aquifers contain more water in storage than the perennial yield. Thus, water remains available. The DWR estimates total storage of the Basin at approximately 42,000 af. Provided annual pumping does not exceed safe yield, the groundwater basin will continue to contain sufficient water during multiple dry-year conditions.

The DWP's system has an instantaneous pumping capacity of roughly 4,300 gallons per minute (gpm) with approximately 500 gpm of this capacity is from slant wells. During droughts, water production from slant wells will decline, requiring vertical wells to make up lost production.

Due to the estimated 42,000 acre-feet of storage capacity in the Basin and proper groundwater management, there should be sufficient groundwater to meet future supply

needs.

7.5.2 Basis of Water Year Data

The assumptions that underlie the calculations of supply and demand are based on historical demand data for the DWP.

Table 7.2 Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	2010
Single-Dry Water Year	2001
Multiple-Dry Water Years	2000-2002

To determine the average demand year, the DWP's historical per capita water usage was evaluated. By normalizing water consumption with population and thus expressing consumption in gpcd, differences in demand due to growth were eliminated. The historical per capita consumption from the period 1995 to 2010 is shown in Figure 7.1. The average consumption during this period was 96 gpcd.

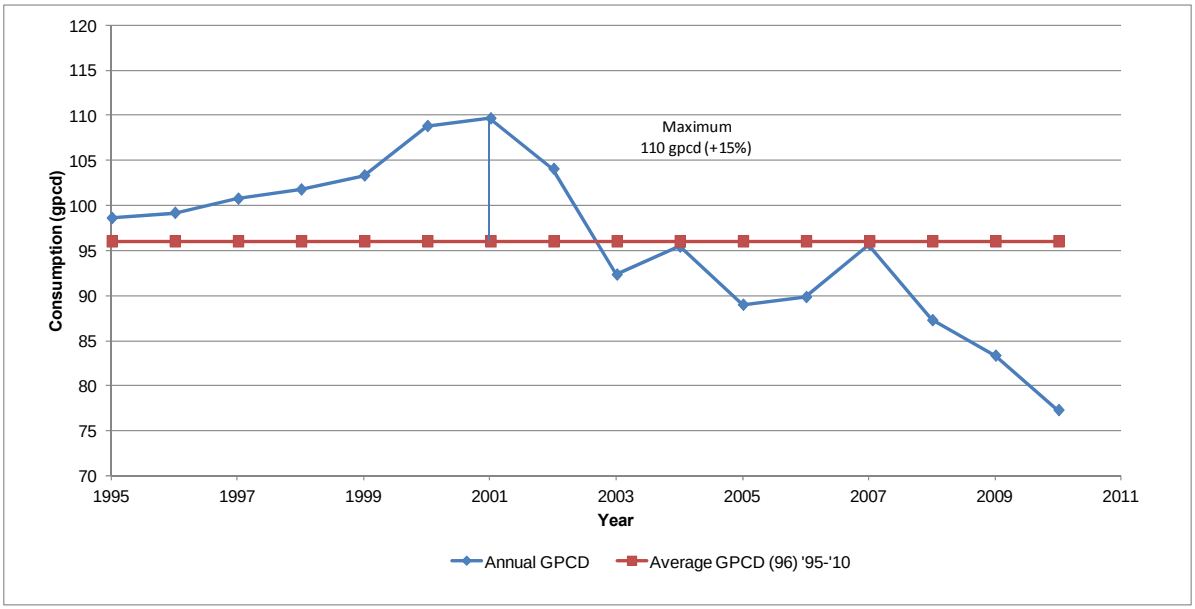

Figure 7.1 Historical Per Capita Consumption Variation

The years chosen to represent the following scenarios were determined by examining demand shifts. The 2001 demand was 15 percent greater than the average gpcd demand over the rest of the 16-year period. Per capita consumption in the multiple-dry year period of 2000 to 2002 was approximately 108 gpcd, 12 percent higher than the average usage. For conservative planning purposes, demand was therefore increased by 15 and 12 percent for the single-dry year and multiple-dry year, respectively.

The supply source breakdown for these historical conditions is presented in Table 7.3.

Table 7.3 Supply Reliability Source Breakdown – Historic Conditions

Water Supply Source	Average Year (2010)	Single Dry Year (2001)	Multiple Dry Years		
			2000	2001	2002
Groundwater	98%	98%	98%	98%	98%
Imported Water	2%	2%	2%	2%	2%

Notes:
Source: DWP production records.

Despite changing conditions, the demand from groundwater and imported water use has remained constant and is projected to do so in the future.

7.5.3 Average Year

The projected demand and supplies are compared in 5-year increments in Table 7.4, Table 7.5, and Table 7.6. First, the projected average year demand and future years are compared with 2010 demand. It is projected that DWP has sufficient supplies available to meet demand through year 2035 under average year conditions.

Table 7.4 Supply and Demand Comparison – Normal Year (AFY)

Water Sources	2010	2015	2020	2025	2030	2035
Supply						
Imported Water Supply	53	55	57	59	61	63
Groundwater Supply	2,152	2,228	2,307	2,389	2,474	2,562
Total Supply	**2,205**	**2,283**	**2,364**	**2,448**	**2,535**	**2,625**
Demands						
Imported Water	53	55	57	59	61	63
Groundwater	2,152	2,228	2,307	2,389	2,474	2,562
Total Demand	**2,205**	**2,283**	**2,364**	**2,448**	**2,535**	**2,625**
Difference Supply - Demand	**0**	**0**	**0**	**0**	**0**	**0**

Notes:
1) Supplies are assumed to be equal to demand, up to 3,100 afy (DWP's share of the operating safe yield of the groundwater basin).

As shown in Table 7.4, it is projected that DWP has sufficient supplies available to meet demand through year 2035 under average year conditions.

7.5.4 Single-Dry Year

As described in the previous section, the projected average year water demand was increased by 15 percent to estimate the water demand during a single-dry year.

Table 7.5 Supply and Demand Comparison – Single Dry Year (AFY)

Water Sources	2010	2015	2020	2025	2030	2035
Supply						
Imported Water Supply	61	63	65	68	70	73
Groundwater Supply	2,475	2,563	2,654	2,748	2,845	2,946
Total Supply	**2,536**	**2,626**	**2,719**	**2,815**	**2,915**	**3,019**
Demands						
Imported Water	61	63	65	68	70	73
Groundwater	2,475	2,563	2,654	2,748	2,845	2,946
Total Demand	**2,536**	**2,626**	**2,719**	**2,815**	**2,915**	**3,019**
Difference Supply - Demand	**0**	**0**	**0**	**0**	**0**	**0**

Notes:

1) Supplies are assumed to be equal to demand, up to 3,100 afy (DWP's share of the operating safe yield of the groundwater basin).

The DWP is projected to have sufficient supply available to meet water demand through 2035 for single dry year conditions.

7.5.5 Multiple-Dry Years

Projected average year water demand was increased by 12 percent to estimate the water demand during multiple dry years.

Table 7.6 Supply and Demand Comparison – Multiple-Dry Years (AFY)

Water Sources	2010	2015	2020	2025	2030	2035
Supply						
Imported Water Supply	59	61	64	66	68	71
Groundwater Supply	2,410	2,496	2,584	2,676	2,771	2,869
Total Supply	**2,470**	**2,557**	**2,648**	**2,742**	**2,839**	**2,940**
Demands						
Imported Water	59	61	64	66	68	71
Groundwater	2,410	2,496	2,584	2,676	2,771	2,869
Total Demand	**2,470**	**2,557**	**2,648**	**2,742**	**2,839**	**2,940**
Difference Supply - Demand	**0**	**0**	**0**	**0**	**0**	**0**

Notes:
1. Supplies are assumed to be equal to demand, up to 3,100 afy (DWP's share of the operating safe yield of the groundwater basin).

The DWP is projected to have sufficient supply available to meet water demand through year 2035 under multiple-dry year conditions.

7.6 TRANSFER AND EXCHANGE OPPORTUNITIES

The BBCCSD is the water supplier for a portion of the Bear Valley, providing water to unincorporated areas of Big Bear City and the eastern portion of the Valley. Water transfers are possible through two emergency supply interconnections between the BBCCSD and DWP systems. These interconnections are for emergencies that disrupt the DWP's or the BBCCSD's ability to serve their customers. The interconnections are intended to be used until either agency declares water exchanges are no longer necessary.

There are no set agreements between the BBCCSD and DWP for limits on the quantity of water that could be transferred. Each transfer would be evaluated on a case-by-case basis but in no way would be allowed to affect the transferring agency's ability to supply their customers' needs (CDM, 2005).

7.7 OPPORTUNITIES FOR DESALINATED WATER

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water, and groundwater.

7.7.1 DWP Desalination Opportunities

No opportunities exist for development of desalinated water by the DWP. Participation in a ocean water desalination plant would be cost prohibitive as the City is located approximately 90 miles inland and located at 6,750 feet above sea level. Due to its physical location and the fact that DWP only imports 2 percent of its water supply, participating in a regional water exchange programs is not practical.

Table 7.7 Desalination Opportunities for the DWP

Sources of Water	Opportunities for Desalinated Water
Ocean Water	None
Brackish Ocean Water	None
Brackish Groundwater	None
Other	None

Groundwater Desalination

The DWP has not identified any potentially cost-effective desalination opportunities.

Seawater Desalination

The DWP has not identified any potentially cost-effective desalination opportunities.

7.8 CLIMATE CHANGE IMPACTS ON SUPPLY RELIABILITY

Because the DWP is nearly 100 percent reliant on groundwater for its potable water supply, the effects of climate change are best summarized by considering the effects of the region as a whole. These effects will likely include:

- Reduction in snowpack, which is a significant source of water as it melts and feeds aquifers in the San Bernardino Mountains
- Increase in intensity and frequency of extreme weather events
- Effects on groundwater recharge
- General decline in ecosystem health and function
- Changes to demand levels and patterns

As scientific understanding of climate change continues to advance, the nature of these impacts and the impact on water supply availability and reliability will be thoroughly studied and addressed.

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Chapter 8

WATER SHORTAGE CONTINGENCY PLAN

The UWMPA requires that UWMPs include an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

8.1 STAGES OF ACTION

The UWMPA requires that UWMPs include an urban water shortage contingency analysis that addresses specified issues.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.*

8.1.1 Water Shortage Stages and Reduction Objectives

The following sections describe the DWP's water shortage stages and the conservation measures employed during each stage, as outlined in Resolution No. DWP 2007-02 (see Appendix F). These stages are only enacted during a water shortage emergency.

Permanent Water Use Policies and Efficiency Requirements

Water use efficiency requirements are detailed in the DWP's rules and regulations. Violations are considered waste and an unauthorized use of water, which result in penalties as outlined in Resolution No. DWP 2008-05 (see Appendix F).

1. Customers are encouraged to use native and water-conserving plants for landscaping.

2. Customers are required to minimize the use of turf at all new and retrofitted commercial and residential landscapes.

3. Water conservation, emphasizing water use efficiency, is required for landscaping and irrigation.

4. The DWP shall require and promote development of water conservation plans for all customers whose water use exceeds reasonable guidelines developed the DWP.

5. The DWP shall require repair of all leaks, when detected.

6. All outdoor irrigation systems shall be shut off and winterized between November 1st and April 1st, annually.

7. The DWP will establish reasonable water use and irrigation standards for all residential and commercial customers in its service area

Conservation Stage I – (5 Percent Overall Reduction of Water Use, 15 Percent Outdoor Reduction of Water Use)

Conservation Stage I exists when the DWP Board of Commissioners reviews the recommendations of the Technical Review Team and determines that a drought, water supply shortage, or a threatened water shortage exists and reductions in customer allocations are necessary. In this case, an overall 5 percent reduction of water use will be required.

The following water conservation requirements apply during a declared Conservation Stage I, as outlined in Resolution 2007-02.

1. Hose washing of sidewalks, walkways, driveways, parking areas, patios, porches or verandas is prohibited.

2. Landscape irrigation will be permitted only every other day, with addresses ending in odd numbers watering on odd numbered calendar days and addresses ending in even numbers watering on even numbered calendar days.

3. DWP water may not be used for soil compaction or dust control.

4. Washing of vehicles, trailers, buses, or boats anywhere but at commercial car washes must be conducted with the use of a bucket and a hose equipped with a shut-off nozzle.

5. Use of water from fire hydrants, except for fire protection, is prohibited.

Conservation Stage II – (10 Percent Overall Reduction of Water Use, 30 Percent Outdoor Reduction of Water Use)

Conservation Stage II includes all prohibitions and regulations as outlined in Stage I , plus the following:

1. Outdoor irrigation will be permitted only on days authorized by the DWP Board of Commissioners.

2. No new turf will be permitted in any location.

Conservation Stage III – (25 Percent Overall Reduction of Water Use, 60 Percent Outdoor Reduction of Water Use)

Conservation Stage III includes all prohibitions and regulations as outlined in Stages I and II, plus the following:

1. Outdoor irrigation will be permitted only two days per week, and will be specified by the DWP.

2. Irrigation of turf will be prohibited.

3. No DWP water will be used for ponds, streams, or fountains with a capacity of greater than 50 gallons.

4. No new turf will be permitted at any location.

Conservation Stage IV – (45 Percent Overall Reduction of Water Use, 100 Percent Outdoor Reduction of Water Use)

Conservation Stage IV includes all prohibitions and regulations as outlined in Stages I, II, and III regulations, plus the following:

1. No outdoor water use will be permitted except commercial car washes that recycle water. This includes water for irrigation, water for ponds, streams, fountains, and swimming pools.

Administration of Water Shortage Emergency Program

The existence of Stage I, Stage II, Stage III, or Stage IV conservation conditions may be declared and adopted by the DWP in accordance with California State law.

8.2 WATER SHORTAGE CONTINGENCY ORDINANCE/ RESOLUTION

UWMPs are required to include an urban water shortage contingency analysis that includes a draft water shortage contingency resolution or ordinance.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (h) A draft water shortage contingency resolution or ordinance.*

The DWP's Water Shortage Response Plan is outlined in Resolution 2007-03 (see Appendix F).

8.3 PROHIBITIONS, CONSUMPTION REDUCTION METHODS, AND PENALTIES

UWMPs must include an urban water shortage contingency analysis that addresses methods to reduce consumption.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
>
> *10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*
>
> 10632 (f) Penalties or charges for excessive use, where applicable.

8.3.1 Mandatory Prohibitions on Water Wasting

The DWP has permanent prohibitions in place for wasteful practices, including restrictions on the following.

- Guidelines for landscaping and outdoor irrigation
- Obligation to fix leaks, breaks, or malfunctions
- Requirements for water efficient retrofits
- Hot water line insulation requirements
- Requirements for commercial establishments such as restaurants and hotels

8.3.2 Excessive Use Penalties

Violations of the DWP's water use rules and regulations may be subject to penalties established in Resolution No. DWP 2008-05.The DWP may not terminate service due to a customer's failure to comply with the DWP's rules and regulations unless the DWP first gives notice of the violation and the consequence of the violation. Every failure to comply notice will include all of the following information.

- The name and address of the customer whose account is in violation of the DWP's rules and regulations.
- The specific nature of the violation.
- The deadline by which the customer must comply with the DWP's rules and regulations.

- The consequences of failing to comply with the DWP's rules and regulations.
- The telephone number of a DWP representative who can provide additional information regarding the notice.

When a notice of violation has been sent to an owner of a property that has multiple tenants, the DWP will endeavor to provide notice to each unit whether residential or commercial.

Within fourteen calendar days of the date of the failure to comply notice, the customer must correct the violation or contact the DWP staff regarding correction of the violation. If the customer fails to correct the violation or contact the DWP staff regarding correction of the violation, the DWP will move forward with terminating service.

After contacting DWP staff, if DWP staff determines that the customer is unable to comply with the DWP's rules and regulations within the time period prescribed by the DWP but is willing to comply and has made reasonable progress towards compliance, the DWP may grant an extension for compliance, not exceeding twelve months. If, however, the customer has not made reasonable progress to comply with said rules and regulations, the DWP will proceed to terminate service unless the customer appeals that decision to the Board of Commissioners. The customer's failure to appeal, in the case where the customer is not making reasonable progress to comply with said rules and regulations, will result in the termination of service.

8.3.3 Review Process

A customer will have the right to a hearing before the Board of Commissioners, if the DWP receives a written request for such a hearing on or before five business days after the DWP staff renders a decision. The written request for a hearing will include a statement setting forth the reasons why the customer disagrees with the decision of DWP staff. Documentation that substantiates the applicant's position must be submitted with the request for a hearing.

Upon request for a hearing, the General Manager will contact the customer regarding the proposed date for the hearing. The hearing will be conducted at the next regularly scheduled Board meeting for which the hearing can be placed on the agenda.

If the Board does not render a decision at the hearing, the Board will render a written decision on or before five business days following the date of the hearing. The decision of the Board will be final.

Upon completion of the appeal process and a determination that the customer has failed to comply with the DWP's rules and regulations, the DWP may move forward with the termination of service.

8.4 REVENUE AND EXPENDITURE IMPACTS/MEASURES TO OVERCOME IMPACTS

UWMPs are required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*
>
> *10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.*

When water shortage contingency actions are being implemented, the DWP will utilize its water rate to cover additional expenditures.

8.5 ACTIONS DURING A CATASTROPHIC INTERRUPTION

UWMPs must include an urban water shortage contingency analysis that addresses catastrophic interruptions of water supplies.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

During declared shortages, or when shortage declarations appear imminent, emergency regulations can be enacted by the DWP Board of Commissioners or the General Manager. Declared emergencies will be addressed in three phases as outlined in Resolution DWP No. 2007-03.

8.5.1 Assessment Phase

The Assessment Phase is defined as beginning upon the declaration of an emergency at the inception of the event. Upon the declaration of an emergency DWP staff will assess the emergency and its potential effects on the DWP's ability to provide water for human consumption, sanitation, and fire protection. This assessment should be completed within 48 hours or less.

Use of water outdoors for other than emergency purposes will be prohibited. Use of water indoors for purposes other than human consumption, sanitation, and fire protection will be prohibited. All other water use will be minimized.

8.5.2 Emergency Phase

The Emergency Phase will begin and continue as long as emergency conditions persist. Use of water outdoors for other than emergency purposes will be prohibited. Use of water indoors for purposes other than human consumption, sanitation, and fire protection will be prohibited. All water use will be minimized.

8.5.3 Recovery Phase

The Recovery Phase will last until normal conditions return to the DWP service area. The use of water outdoors for other than emergency purposes will be prohibited, unless the General Manager determines that restricted outdoor water use is reasonable given the current state of the DWP's water system. When restricted outdoor use is permissible, the public will be provided with a specific list of approved outdoor water uses. All water use will be minimized.

8.6 REDUCTION MEASURING MECHANISM

UWMPs must include an urban water shortage contingency analysis that addresses a method to measure the reduction in demand.

> *10632. The plan will provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

The DWP's water system currently has water meters on all connections. These meters record the amount of water consumed at each location. DWP will use these meters in concert with the budgeted water allocations for each customer to monitor district-wide actual reductions in water use.

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